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EXAMINER

BAREFORD, KATHERINE A

ART UNIT PAPER NUMBER

1762

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,315

Applicant(s)

CALL, EDWIN YOUNG

Examiner

Katherine A. Bareford

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,7,9-21 and 23-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Claims 3, 5, 8 and 22 are canceled

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The Examiner the amendment of August 2, 2004 and the further amendment of Sept. 10, 2004 have been received. Claims 1-2, 4, 6-7, 9-21 and 23-27 are present. Claims 3, 5, 8 and 22 have been canceled.

Specification

2. The objection to the disclosure because of informalities at page 1 of the specification, is withdrawn as applicant has indicated that this case is a national stage application of PCT/US01/13924, filed May 1, 2001 with the amendment of Sept. 10, 2004.

Claim Objections

3. Claim 13 is objected to because of the following informalities: at claim 13, line 4, "a second wire of zinc or with a zinc or zinc based alloy" should be "a second wire of zinc or zinc based alloy" for grammatical clarity.

Appropriate correction is required.

4. The objection to claim 5 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim is withdrawn due to applicant's cancellation of the claim in the August 2, 2004 amendment.

5. The objection to claim 7 because of informalities is withdrawn due to applicant's August 2, 2004 amendments to the claims.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-2, 4, 6-7, 9-21 and 23-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 1 has been amended to require twin wire arc spraying wherein one wire is zinc and the second wire is "zinc or a zinc alloy". Similarly, independent claim 13 has been amended to require a second wire of "zinc or zinc based alloy". This is new matter, because in the specification at page 7, lines 25-31, the only support for electric-arc, twin wire spraying is found. There it states that one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire is either all zinc or all one of the other listed metals. No teaching or suggestion of a "zinc alloy" is provided.

Independent claim 7 no requires the twin wire arc spraying wherein one metal wire is "containing zinc" and a "second wire of zinc or zinc alloy". This is new matter, because in the specification at page 7, lines 25-31, the only support for electric-arc, twin wire spraying is found. There it states that "one wire may be zinc" when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the first wire is all zinc and the second wire is either all zinc or all one of the other listed metals. No teaching or suggestion of a "zinc alloy" or a first wire "containing zinc" is provided.

In claim 12, it is indicated that the zinc metal coating can also contain an element from the group consisting of "copper, carbon, tin, nickel, aluminum, magnesium and mixtures thereof". However, at page 7, when performing the twin wire spraying, the only other elements that can be in the coating are "copper, aluminum, tin, nickel or magnesium." Thus, no support is present for the use of the carbon or "mixtures thereof".

In independent claim 19, it is now required that that "at least one wire is 100% zinc" when performing the twin wire thermal spray process. However, there is no requirement as to the second wire. This is new matter, because in the specification at page 7, lines 25-31, the only support for electric-arc, twin wire spraying is found. There it states that one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire must be either all zinc or all one of the other listed metals. Furthermore, in claim 19, it is indicated that the zinc metal coating can also contain an element from the group consisting of "carbon, copper, tin, nickel, aluminum, magnesium and mixtures thereof". However, at page 7, when performing the twin wire spraying,

the only other elements that can be in the coating are "copper, aluminum, tin, nickel or magnesium." Thus, no support is present for the use of the carbon or "mixtures thereof".

In new claim 27, it is required that the "second wire is a zinc-copper alloy". This is new matter, because in the specification at page 7, lines 25-31, the only support for electric-arc, twin wire spraying is found. There it states that one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire must be either all zinc or all one of the other listed metals.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 102

8. The rejection of claims 1-2, 5, 13-16 and 18 under 35 U.S.C. 102(b) as being anticipated by "The Application of Zn-Al Coatings to Prevent Corrosion of an Iron Boat" article (hereinafter Zn-Al article) is withdrawn due to applicant's amendments to the claims of August 2, 2004.

9. The rejection of claims 1-2, 5-6, 13-16 and 18 under 35 U.S.C. 102(b) as being anticipated by Goldheim (US 3097932) is withdrawn due to applicant's amendments to the claims of August 2, 2004.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-2, 4, 6-7, 9-21, 23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over "The Application of Zn-Al Coatings to Prevent Corrosion of an Iron Boat" article (hereinafter Zn-Al article) in view of Hasui et al (US 5763015).

Zn-Al article teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. page 877 and 880. The protection method protects marine surfaces from bio-fouling without external electrical power. See page 878 ("corrosion test of sprayed coating" and "appearance" sections). The surface is directly sprayed with a zinc based alloy coating (Zn-Al) produced by a flame spraying (this would be either a combustion wire or powder process, due to the "combustion" of gases to provide the flame for the flame spraying) thermal spray process. See page 877 ("spraying" section and figure 2). This provides a protective coating of the zinc based alloy on the surface to provide protection to the surface. Page 877 and 880.

Claim 2: the coating is free of tributyltin (it is 87 % Zn and 13 % Al). page 877.

Claim 10: a sealer on top of the thermal spray coating is provided. page 877.

Claim 11, 19: Zn-Al article teaches that the coating can be 87% zinc, as in claim 11.
page 877.

Claim 12, 19: Zn-Al article teaches that the coating can also contain aluminum. Page 877.

Claim 13: Zn-Al article also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying the surfaces with a zinc based alloy coating. Page 877 and 880 and see page 878 ("corrosion test of sprayed coating" section).

Claim 14: the structure can be a hull of a ship. Page 877.

Claims 15, 16, 18, 23: a marine structure submerged or partially submerged in water having been coated as in claim 1 or 13 is provided. See page 877 and 880.

12.

Zn-Al article teaches all the features of these claims except (1) the twin wire arc spraying, with one wire zinc and the other a zinc alloy (claim 1, 7, 13, 19), (2) the specific substrate (claim 4, 6, 20, 21), (3) the specific washing, blasting process (claim 7), (4) the multiple layers of thermal spraying (claim 9), (5) the amount of the zinc in the coating depends on the surfaces to be coated (claim 11, 19), and (6) the propeller (claim 17, 25, 26). Zn-Al article does teaches that the substrate can be steel (claims 4, 20). Page 877. Zn-Al article also teaches that the substrate is prepared for thermal spraying by degreasing followed by blast cleaning with steel grit to remove rust and scale (claim 7). Page 877.

Hasui teaches spraying a coating of zinc and aluminum onto a substrate. Column 1, lines 1-15. The applied coating is used to protect a substrate against sea water. Column 1, lines 1-30. The spray coating can be formed on a substrate of steel, aluminum, zinc, a plastic, glass or wood.

See column 2, lines 20-35. The substrate is spray coated using a two (twin) wire electric arc spraying system. Column 3, line 50 through column 4, lines 25. One wire can be zinc and the other wire an alloy of zinc and aluminum. Column 4, lines 5-25. The amount of zinc vs. aluminum in the spray coating is based on the particular purpose or material of the substrate. Column 4, lines 15-30. For a steel substrate the percentage of zinc can be 50-90 %. Column 4, lines 20-30. After the spraying of the zinc/aluminum and sealing treatment is carried out on the coating. Column 4, lines 30-45.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zn-Al article to (1) perform twin wire arc spraying, with one wire zinc and the other a zinc alloy as suggested by Hasui to provide a desirable surface to be sealed for protection, because Zn-Al article teaches protecting a marine article of iron based material by spraying a zinc alloy coating on the surface and then sealing the coating and Hasui teaches to protect a substrate from an environment such as sea water by twin wire arc spraying with one wire zinc and the other zinc/al alloy and then sealing the coating. (2) It would further have been obvious to modify Zn-Al article to use a carbon steel or stainless steel substrate with an expectation of producing a desirable coated article or a wood or plastic substrate as suggested by Hasui with an expectation of desirable protection, because Zn-Al article teaches that the substrate is a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that one of ordinary skill in the art knows that carbon steel and stainless steels are well known forms of steel, and Hasui teaches that it is desirable to protect wood and plastic substrates as well as steel substrates. It would further have been obvious to modify Zn-Al article in view of Hasui to (3) wash with water

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to remove soluble materials and blast the surface to white metal before thermal spraying with an expectation of producing a desirable coated article, because Zn-Al article teaches degreasing and grit blasting to remove rust and scale before thermal spraying, and it is the Examiner's position that it is well known in the art of degreasing and grit blasting before thermal spraying to degrease by washing in water to remove material on the substrate and to grit blast to white metal when removing rust and scale. It would further have been obvious to (4) modify Zn-Al article in view of Hasui to spray multiple layers to achieve the desired coating thickness with an expectation of achieving a desirable coated product, because Zn-Al article teaches spraying to a desired minimum thickness (see page 878, top of 2nd column, -- it must be over 100 microns) and it is the Examiner's position that coating multiple layers (i.e. multiple passes of the spray gun) is well known in the thermal spraying art in order to achieve the desired build up of thickness into the desired range. It would further have been obvious to modify Zn-Al article to (5) optimize the amount of Zn in the coating based on the specific substrate used as suggested by Hasui so as to achieve the optimum final product protection, because Zn-Al article teaches a test of a specific example of Zn-Al, and further indicates (at page 880) that further investigation is to be performed, indicating the desire to optimize the specific coating used and Hasui teaches to select the amount of Zn in the coating based on the specific substrate to be used. It would further have been obvious to modify Zn-Al article in view of Hasui to (6) apply the coating system to a propeller so as to produce a protected propeller, because Zn-Al article teaches a coating to prevent corrosion and fouling, and propellers would be a marine surface that would be desirable to protect from corrosion and fouling so as to prolong their useful economic life.

13. Claims 1-2, 4, 6, 10, 13-18, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldheim (US 3097932) in view of Hatfield (US 4578310).

Goldheim teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. Column 1, lines 5-15. The protection method protects marine surfaces from bio-fouling without external electrical power. Column 1, lines 5-15 and column 2, lines 5-35. The surface is directly sprayed with a zinc coating produced by a flame spraying (this would be either a combustion wire or powder process, due to the "combustion" of gases to provide the flame for the flame spraying) thermal spray process. Figure 1 and column 1, lines 35-45 (the first layer of zinc is applied directly to the surface). This provides a protective coating of the zinc on the surface to provide protection to the surface. Figure 1 and column 2, lines 25-35.

Claim 2: the coating is free of tributyltin (it is all zinc). Column 1, lines 40-50.

Claim 4: Goldheim also teaches that the substrate can be steel. Column 1, lines 15-20.

Claim 6: the surface can be plastic or wood. Column 1, lines 15-20.

Claim 10: Goldheim does teach applying a sealer system on top of the thermal spray coating. Figures 2-3 and column 45-55.

UB Claim 13: ^{Goldheim}~~Zn-Al article~~ also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying the surfaces with a zinc based alloy coating. Column 1, lines 35-45 and column 2, lines 5-35 (the application of the zinc based coating).

Claim 14: the structure can be a hull of a ship. Column 1, lines 5-15.

Claims 15, 16 and 18: a marine structure submerged or partially submerged in water having been coated as in claim 1 or 13 is provided. See column 1, lines 5-15 and column 2, lines 5-35.

Claim 24: the coating is 100 percent zinc. Column 1, lines 40-50.

Goldheim teaches all the features of these claims except (1) the twin wire arc spraying, with both wires of zinc (claim 1, 13), (2) the specific steel substrate (claim 4), and (3) the propeller (claim 17, 26).

Hatfield teaches that when applying a metal film of a material such as zinc, it is well known to use a twin wire electric arc spraying system, where two continuously fed zinc wires arc and melt. Column 3, lines 5-20. As well, such zinc coatings can also be applied by flame spraying. Column 3, lines 5-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Goldheim to (1) use twin wire arc spraying, with both wires of zinc as suggested by Hatfield with an expectation of producing a desirable coated article, because Goldheim teaches flame spraying a zinc coating, and Hatfield teaches that when applying zinc coatings, either flame spraying or twin wire arc spraying with both wires of zinc are desirable application methods. It would further have been obvious to (2) modify Goldheim in view of Hatfeld to use a carbon steel or stainless steel substrate with an expectation of producing a desirable coated article, because Goldheim teaches that the substrate can be a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that one of ordinary skill in the art knows that carbon steel and stainless steels are well known forms of

steel. It would further have been obvious to modify Goldheim in view of Hatfield to (3) apply the coating system to a propeller so as to produce a protected propeller, because Goldheim teaches a coating to prevent fouling of various marine surfaces (see column 1, lines 5-15), and propellers would be a marine surface that would be desirable to protect from fouling so as to prolong their useful economic life.

Response to Arguments

14. Applicant's arguments with respect to claims 1-2, 4, 6-7, 9-21 and 23-27 have been considered but are moot in view of the differing grounds of rejection.

Applicant has amended the claims to provide various requirements as to twin wire arc spraying. Due to this amendment, 35 USC 112, first paragraph new matter rejections were made as discussed above. Furthermore as to the 35 USC 103 rejections, new references to Hasui and Hatfield were provided as to the twin wire spraying issues.

WO Applicant has also provided arguments as to the use of the propeller, arguing that applicant's invention has proven to be particularly suitable for propellers, however, no showing as to the feature has been provided as to why it is unexpectedly better than for other marine surfaces. As to the thickness of the coating of Zn-Al article, page 878, top of 2nd column teaches that the thickness is desired to be over 100 microns, indicating that coating must be applied until that thickness reached. As to the optimizing of the coating materials of Zn-Al Article, further note the teachings of Hasui as discussed in the rejection above.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:30-4:00) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

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Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER